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ABSTRACT

This study investigated whether alcohol use by public school students differs in its relationship to other variables when analyzed on the individual level versus the aggregated group level. The study presents a model and a set of analytic techniques for studying the ways that school and individual variables relate to adolescent alcohol abuse. Recently developed Hierarchical Linear Model procedures were used to estimate and test the school-level contextual effects, controlling for the student-level variables. The analyses are based on 61 schools, with 10,344 students from 6th, 8th, 10th, and 11th grades. The student outcome, abuse, is the level of alcohol abuse determined by multiplying the frequency of alcohol use by the extent to which the student gets "high" when using alcohol. The two student-level determinants in the within-school model are social, reflecting how much the student socializes with friends, and good, the degree to which the student fits the traditional stereotype of good by getting good grades, staying out of trouble, attending church, and talking with parents about problems. The estimated social effect in this model is positive, indicating that more socializing is associated with more abuse, while a negative coefficient for good suggests that increasing goodness is associated with decreasing abuse. The predicted effect of social on abuse was generally positive, and the predicted effect of good was generally negative. (The effects are represented graphically.) (LLL)

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The Effects of Context on Correlates of Adolescent Alcohol Abuse

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Objectives

Investigators who study the correlates of drug use in public schools typically employ a sampling design in which students are nested within a larger unit such as the school, city, region, or state. Generally, the analysis of data is performed only on student level data, and the effects of the nested design on variances of estimated parameters are not taken into account. The failure to study contextual effects of sampling units on the correlations of drug usage with with other variables may obscure important moderating effects. For example, the strength of relationship between drug usage and a particular variable of interest may differ considerably when viewed from the perspective of students within a particular school as versus all students from all schools in the sample (Boyd & Iverson, 1979). In addition, the "effective N" for the entire sample of students may be considerably lower than the observed N, and may lead the researcher to declare results as significant, when in fact, they are not (Wilson, 1989).

The objective of this investigation is to determine whether alcohol use by public school students differs in its relationship to other variables (e.g., friends' use) when analysed on the individual level versus the aggregated group level. It is hoped that the procedures discussed here will offer effective methods for evaluating student data in light of moderating school-level effects.

Perspective

Prior research relates adolescent drug use and abuse to a wide variety of variables that include peer influence, family disturbance, and poor school performance, to name a few (Newcomb Bentler, 1987). Recently, Stein, Newcomb, and Bentler (1987) completed an 8-year longitudinal study in which they employed confirmatory factor analysis and a structural model to identify latent variables that appeared to exert a causal influence, over time, on drug use and abuse. They found drug use in the first year of the study to be related to peer drug use (r=.81), adult drug use (r=.51), social conformity (r=.69), and family disruption (r=.13).

The contribution of the current cross-sectional study will be to determine whether the contextual effects of the schools which students attend modify the relationships between alcohol abuse and measured variables that are subsumed by the latent variable identified by Stein, Newcomb, and Bentler (1987). For example, in schools where alcohol abuse is high, the relationship between alcohol abuse by individuals and abuse by their friends may be higher or lower than in schools where abuse is low.

Educational and Scientific Importance of the Study

Research that investigates only individual-level correlates of alcohol abuse assumes that variability of these relationships among schools is due to sampling fluctuations. This assumption may or may not be true. It is important to determine whether school "climates" modify observed individual-level relationships. This study presents a model and a set of analytic techniques for studying the ways that school- and individual-level variables relate to adolescent alcohol abuse.

Methods

A unique aspect of this study is the method of analysis. Recently developed Hierarchical Linear Model (HLM) procedures (e.g., Raudenbush & Bryk, 1986) are used to estimate and test the school-level contextual effects, controlling for the student-level variables. Briefly, this approach is based on a within-school model with the individual student outcome, say alcohol abuse, expressed as a function of student-level determinants. The coefficients in this model are themselves assumed to be random, varying from school to school, as a function of school characteristics (e.g., average alcohol abuse in the school). A set of between-school models represents these relationships, with the associated coefficients reflecting the contextual effects of interest here. This new HLM approach addresses problems of incorrect standard errors and inefficient estimation, which were associated with previous analytical approaches based on Ordinary Least Squares. The required analyses are conducted with the HLM computer program (Bryk, Raudenbush, Seltzer, & Congdon, 1986).

Data Source

The subjects were 6th-, 8th-, 10th-, and 12th-grade students enrolled in the Florida public schools. For each grade, a state-wide random stratified cluster sample was drawn, with each school representing one cluster. All schools with at least 10 students at an appropriate grade level were stratified according to three levels of school size, and three levels of minority enrollment. At least two, and no more than five, schools were sampled from each of the nine strata at each grade level. The final sample consisted of 1,930 sixth-graders, 4,951 eighth-graders, 3,751 tenth-graders, and 3,186 eleventh-graders. The total sample size was 13,818 students. After dropping schools with fewer than 30 students, and deleting cases with missing data, the total study sample was 10,344.

The PRIDE Durge Usage Prevalence Questionnaire (Gleaton & Adams, undated) was administered by school personnel in May, 1988. Eight districts in which one or more schools were located refused to participate. The affected schools were replaced by schools from the same strata.

The Models

The analyses are based on 61 schools. The student outcome, "ABUSE", is the level of alcohol abuse determined by multiplying the frequency of alcohol use by the extent to which the student gets "high" when using alcohol. The two student-level determinants in the within-school model are "SOCIAL", reflecting how much the student socializes with friends, and "GOOD", the degree to which the student fits the traditional stereotype of a "good kid" by getting good grades, staying out of trouble, attending church, and talking with parents about problems. The estimated SOCIAL effect in this model is positive, indicating that more socialilzing is associated with more abuse, while a negative coefficient for GOOD suggests that increasing "goodness" is associated with decreasing abuse. The school-level model for the coefficient of the GOOD determinant in the within-school model contains, in this analysis, only the variable of average student abuse (ABUSEM) within the school. The associated contextual effect estimate is negative in sign, indicating that the negative effect of GOOD on individual abuse decreases in magnitude as alcohol abuse becomes more prevalent in the student's school.

Results

The model for alcohol abuse by individual i within school j is assumed to be

$$ABUSE_{ij} = \hat{b}_{j0} + \hat{b}_{j1}SOCIAL_{ij} + \hat{b}_{j2}GOOD_{ij} + R_{ij}$$

where the j subscripts of the model coefficients reflect the possible variation of the coefficients from school-to-school. R_{ij} is the within-school residual, or the part of ABUSE not explained by the included individual-level variables. The individual-level explanatory variables, SOCIAL and GOOD, are centered about their respective school means, resulting in a model intercept, $\hat{b}_{j0}$, which is the mean of student ABUSE for school j.

Of primary interest in this study are the within-school effects of SOCIAL and GOOD on individual ABUSE, represented by the coefficients $\hat{b}_{j1}$ and $\hat{b}_{j2}$, respectively. Variation of these effects over schools will be explained with the school-level variables of grade level (GRADE) and the mean abuse level in the school (ABUSEM).

The means (standard deviations given in parentheses) of the three coefficients in the within-school equation across the 61 schools were 6.173 (2.768) for $\hat{b}_{j0}$, 0.8047 (0.4171) for $\hat{b}_{j1}$, and -0.7545 (0.4310) for $\hat{b}_{j2}$. These results indicate that the within-school effect of SOCIAL on individual ABUSE controlling for GOOD (i.e., $\hat{b}_{j1}$) was generally positive, while the effect of GOOD on ABUSE controlling for SOCIAL ($\hat{b}_{j2}$) was generally negative. A preliminary HLM analysis of the associated "unconditional" model estimated that more than half of the observed school-to-school variation of these two slope coefficients was true variance available for further modeling at

the school level.

The HLM analysis of the variation of the within-school coefficients using the school-level variables of GRADE and ABUSEM resulted in the following model for the within-school effect of SOCIAL on ABUSE

$$\text{SOCIAL effect: } \hat{b}_{j1} = 0.436 - 0.0553*\text{GRADE} + 0.1388*\text{ABUSEM}$$

Both of the coefficients in this model were statistically significant at the 0.05 level. The predicted effect of SOCIAL on ABUSE (i.e., b_{j1}) is generally positive within the range of grade and ABUSEM considered, but the magnitude of the effect is seen to vary with both GRADE and ABUSEM. The positive influence of ABUSEM on b_{j1}, reflecting a strengthening of the positive association between individual ABUSE and SOCIAL with increasing average abuse in a school, is represented graphically in Figure 1 for two grade levels. The negative effect of GRADE is seen to be relatively small in comparison. An alternative representation of offered in Figure 3, and shows two predicted within-school regressions of ABUSE on SOCIAL for grade 8, holding constant GOOD. The relationship is very weak for schools with low average abuse, but is predicted to be moderately strong for schools with high average abuse.

The model for the effect of GOOD on ABUSE was

$$\text{GOOD effect: } \hat{b}_{j2} = 0.2135 - 0.0536*\text{GRADE} - 0.0780*\text{ABUSEM}$$

Both regression coefficients were significant at the 0.05 level. The predicted effect of GOOD is generally negative within the range of GRADE and ABUSEM, reflecting the expected decrease in individual abuse with an increase in the individual level of GOOD, controlling for SOCIAL. The influences of GRADE and ABUSEM on the GOOD effect are both negative; that is, the negative association between ABUSE and GOOD becomes stronger in the higher grades in schools with increased average abuse levels. These effects are represented graphically with two different formats in Figures 2 and 4.

References

Boyd, L. & Iverson, G. (1979). Contextual Analysis. Belmont, CA: Wadsworth.

Bryk, A. Raudenbush, S., Congdon, R., & Seltzer, M. (1986). An introduction to HLM: Computer program and User's Guide. University of Chicago.

Gleaton, T. & Adams, R. (undated). Drug usage prevalence questionnaire. National Parents Resource Institute for Drug Education. Atlanta, GA.

Stein, J., Newcomb, M. & Bentler, P. (1987). An 8-year study of multiple influences on drug use and drug consequences. Journal of Personality and Social Psychology, 53,(6), 1094-1105.

Wilson, M. (1989). An evaluation of Woodruff's technique for variance estimations in educational surveys. Journal of Educational Statistics, 14, (1), 81-102.

THE HLM "SINGLE-EQUATION" INTERPRETATION

The prediction equation for alcohol abuse by individual i within school j is assumed to be

$$ABUSE_{ij} = \hat{b}_{j0} + \hat{b}_{j1}SOCIAL_{ij} + \hat{b}_{j2}GOOD_{ij}$$

$\hat{b}_{j0}$ = expected value of mean ABUSE for school j

$\hat{b}_{j1}$ = expected value of the school-level effect SOCIAL

$\hat{b}_{j2}$ = expected value of the school-level effect GOOD

The HLM "SINGLE-EQUATION" formulation is obtained by expanding the coefficients for school-level effects,

SOCIAL effect: $\hat{b}_{j1} = 0.436 - 0.0553*GRADE + 0.1388*ABUSEM$

GOOD effect: $\hat{b}_{j2} = 0.2135 - 0.0536*GRADE - 0.0780*ABUSEM$

and substituting the results into the prediction equation:

$$\hat{Y}_{ij} = 6.816 + (0.436 - 0.0553*GRADE + 0.1388*ABUSEM) * SOCIAL + (0.2135 - 0.0536*GRADE - 0.0780*ABUSEM) * GOOD$$

(The intercept 6.816 is interpreted as the overall ABUSE level for all schools in the study)

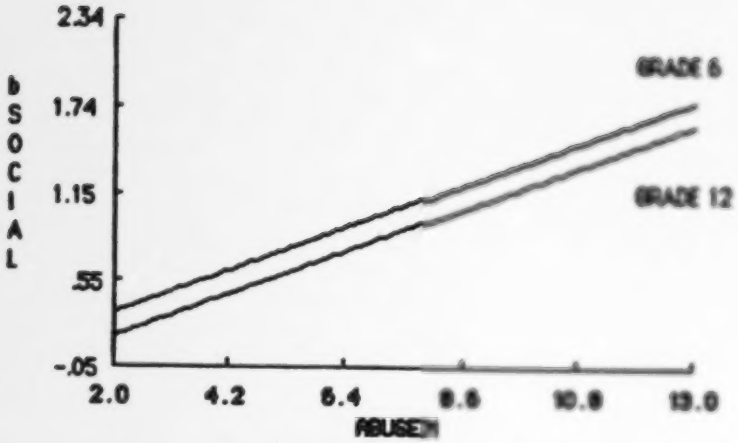

Figure 1. Between Schools Regression of b(SOCIAL) on ABUSEM for Grades 6 and 12 At Mean of GOOD

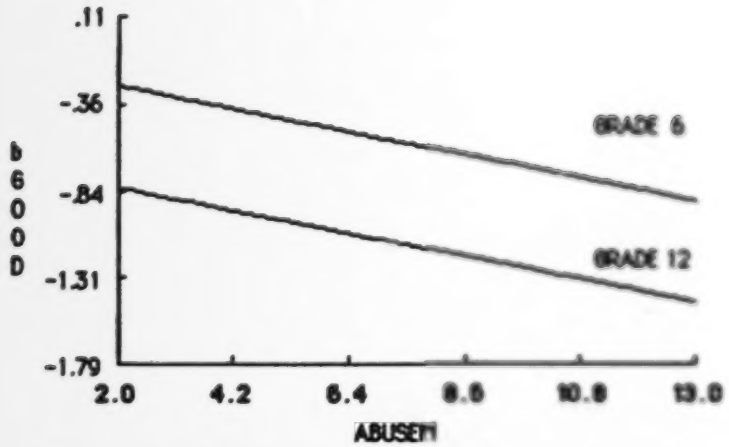

FIGURE 2. Between School Regression of b(GOOD) on ABUSEM for Grades 6 and 12 at Mean of SOCIAL

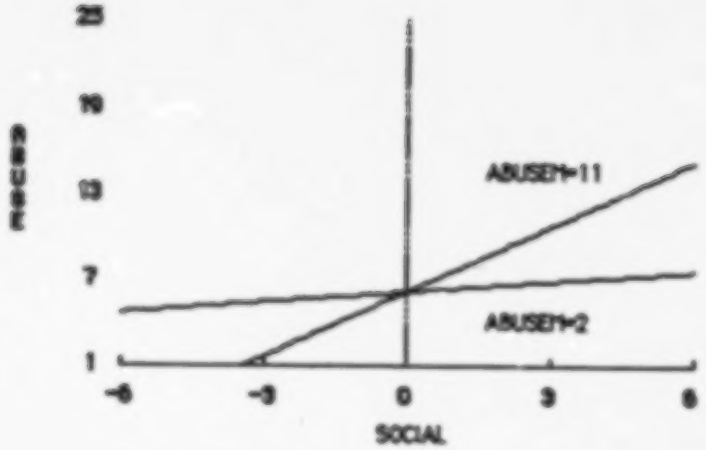

FIGURE 3. Regression of Individual 8-th grade Student ABUSE Scores on SOCIAL at Two Levels of ABUSEM with GOOD Held Constant at the Mean

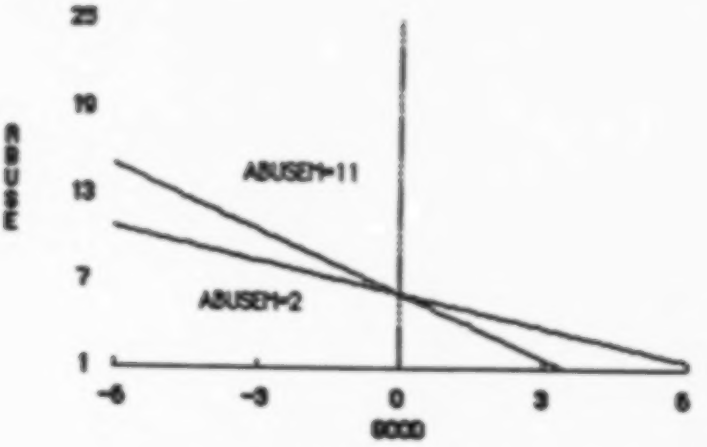

FIGURE 4. Regression of Individual 8-th Grade Student ABUSE Scores On GOOD at Two Levels of ABUSEM with Social Held Constant at the Mean

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